IN THE SPECIFICATION

Please replace paragraph [0006] with the following amended paragraph:

In one embodiment, the present application is directed to a high speed optical system and discloses an InGaAsP photodiode which is sensitive to a wavelength of light, a first source of photons at a first wavelength to which the photodiode is sensitive incident on the photodiode, a second source of photons at a second wavelength to which the photodiode is insensitive incident on the photodiode, an electric field across the photodiode in excess of the breakdown voltage thereof and configured to result in an avalanching of electrons in the photodiode when photons from the first source strike the photodiode, and a capture device in optical communication with and configured to capture light reflected from the photodiode. The avalanche of electrons within the photodiode results in a photorefractive response which changes the index of refraction in the photodiode. ~~Light reflected from the photodiode is modulated by the photorefractive response and is subsequently captured by the capture device.~~

Please replace paragraph [0008] with the following amended paragraph:

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In still another embodiment, the present application is directed to a high speed optical system and discloses an InGaAsP photodiode having a bandgap, the photodiode configured to operate in Gieger mode, a first photon source configured to emit an optical signal of a first wavelength, the first wavelength less than the bandap of the photodiode, a second photon source configured to emit light of a second wavelength, the second wavelength greater than the bandgap of the photodiode, a beam combiner positioned within an optical path and configured to combine the first and second wavelengths, an electric field applied across the photodiode greater than a breakdown voltage thereof, the electric field configured to result in avalanching of electrons in the photodiode when photons from ~~a first photodiode~~ the first photon source are incident thereon, the avalanche of electrons resulting in a photorefractive response within the photodiode, and a capture device in optical communication with and configured to captured modulate light reflected from the photodiode.

Please replace paragraph [0009] with the following amended paragraph:

The present application further discloses various optical-to-optical conversion methods for converting an optical signal of a first wavelength to a second wavelength. One method disclosed in the present application includes ~~baising~~ biasing an InGaAsP photodiode to operate in Geiger

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mode, irradiating [[a]] the photodiode with a first wavelength of light to which the photodiode is sensitive, the first wavelength of light transmitting an optical signal, irradiating the photodiode with a second wavelength of light to which the photodiode is insensitive, modulating light reflected from a surface of the photodiode with a photorefractive reaction within the photodiode, and capturing the modulated reflected light.

Please replace paragraph [0010] with the following amended paragraph:

In an alternate embodiment, the present application discloses configuring an InGaAsP photodiode to operate in Geiger mode, irradiating [[a]] the photodiode with a first wavelength of light transmitting an optical signal, initiating a photorefractive reaction within the photodiode with the first wavelength of light, irradiating the photodiode with a second wavelength of light to which the photodiode is insensitive, modulating light reflected from a surface of the photodiode with the photorefractive reaction within the photodiode, and capturing the modulated reflected light.

Please replace paragraph [0028] with the following amended paragraph:

Figs. 3 - 5 show an embodiment of the optical system 40 during use. As shown in Fig. 3, the first wavelength of light

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44 emitted by the first light source 42 contains an image or signal 70 which is directed to the APD 10 by the beam director 46. In addition, the APD 10 is simultaneously irradiated with the second wavelength of light 54 emitted by the second light source 52. The first wavelength of light 44 containing the signal 70 and a second wavelength of light 54 are combined by the beam ~~combinder~~ combiner 48 and are directed through the $\lambda/4$ plate 50 and the APD 10. As described above, the APD 10 is configured to operate in Geiger mode. The first wavelength of light 44 causes localized pixel heating due to absorption within the photodiode materials, thereby inducing modulation of the refractive index of the photodiode material.

Please replace the ABSTRACT with the following amended paragraph:

The present application is directed to a high speed optical system. In one embodiment, the optical system includes an InGaAsP photodiode which is sensitive to a wavelength of light, a first source of photons at a first wavelength to which the photodiode is sensitive incident on the photodiode, a second source of photons at a second wavelength to which the photodiode is insensitive incident on the photodiode, an electric field across the photodiode in excess of the breakdown voltage thereof and configured to result in an avalanching of electrons in the photodiode when photons from the first source strike the photodiode, and a

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capture device in optical communication with and configured to capture light reflected from the photodiode. The avalanche of electrons within the photodiode results in a photorefractive response which changes the index of refraction in the photodiode. ~~Light reflected from the photodiode is modulated by the photorefractive response and is subsequently captured by the capture device.~~

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